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Linking the Unlinkable

The best advice I know on after-dinner speaking comes from a book of the Apocrypha:

Let thy speech be short, comprehending much in a few words (Ecclesiasticus, 22:8).

It was almost exactly ten years ago when I first spoke at a Clinic on Data Processing. At that time, I was merely a humble spear-carrier—a mere paper-giver. The keynote speech on that occasion was given by Frederick Kilgour. It was the first time that I had seen that eminent gentleman. He looked, then as now, more like the senior senator from Ohio than one of the leading innovators of modern librarianship. The years have rolled by and I find myself with the daunting task of following in the distinguished footsteps of the likes of Mr. Kilgour. Though my hair lacks the true senatorial silveriness which so distinguishes Fred, it has much more gray than it had in 1976. The amount of that gray which is not due to heredity is due, in large part, to wrestling with the principles and practicalities of the online catalog (as we call it for convenience). It is the implications of one aspect of that automated bibliographic control system that I wish to discuss this evening. Specifically, the burden of my song is the idea of using microcomputers as the central component of a third way of achieving and extending developed online catalogs. (Incidentally, I must take full responsibility for the title of this keynote speech. My fondness for facetious titles [and, indeed, for facetiousness in general] has not dimmed with the years and I forced my waggishness upon my distinguished compatriot Professor Wilfrid Lancaster, who is hereby absolved of all responsibility.)

I referred, a little while ago, to the fact that the term *online catalog* is now simply a term of convenience and one which is now so inaccurate as to be seriously misleading. (By the way, though I find the term unsatisfactory, I still prefer it to the horrid acronym OPAC [for “online public access

catalog"]. Quite apart from the overtones of OPEC, there is the idea that an OPAC might be a political action committee which is dedicated to nothing—the zero-PAC.) The idea has never been that we should simply automate the pre-machine catalog (though, to tell the truth, some have tried to do just that), but that we should produce an online system which has at least three important differences from the pre-machine catalog.

The first of these major differences is that the online system should be more responsive to the needs of the library user than is, say, the card catalog and will allow many more ways of obtaining the information which is held in the system. This is readily achievable since even the worst computer systems are more responsive and forgiving than the card catalog ever was. Second, the online system should be more available to the user than its predecessors. By and large, we have achieved this second aim too by siting terminals in various locations in our libraries and communities. This has not been an invariable practice. Some libraries have been influenced by some rather rum “studies” of catalog use which have demonstrated conclusively that library users use card catalogs in places where those catalogs are sited. This clearly proves, to some, that terminals should be situated in the same place as the card catalog. This zany logic leads to a loss of one of the great advantages of the online system. The third important difference, and the one with which I am primarily concerned this evening, is that the online system will contain far more information than its predecessors.

In order to understand and examine this last point, we need to look at the situation which the users faced in using pre-machine systems. The fundamental problem was that the user's expectations were far higher than the capabilities of the bibliographic control system. He or she expected to be able to use the catalog to determine the availability of the materials sought. The catalog was not concerned with questions of availability but with questions of ownership. The user's question is, “*Ubi est meum?*” (“Where is mine?”—Mike Royko's proposed motto for the city of Chicago). The pre-machine catalog's dusty answer was “The library owns, or believes it owns, this item.” It has been amply demonstrated, in libraries and in the wider world, that, when answers do not match questions, a crisis of confidence results. The well-kept secret was, of course, that the information which was needed to answer the users' questions was scattered throughout numerous other files created and maintained by the library. The on-order file, the binding file, the circulation file, the serial record, the serial check-in file...the list of these public and private files was as extensive as it was dreary. Few librarians knew the ins and outs of all of these and almost all users were blissfully ignorant of their very existence. When I first came to the University of Illinois Library, my then-assistant did a census of the paper files maintained in the technical services departments. They were more than sixty in number, of varying sizes and purposes. My favorite was

the "Dead Slavic Serials File." Surely the only thing on God's earth which is sadder than a dead Slavic serial is the memorial within which its demise is recorded! The task of the online replacement for the pre-machine catalog is to bring all this scattered information together and to make it available to the library user.

Since the beginning of computerized bibliographic systems in libraries there has been a perception that there are two ways of bringing all this previously scattered information together. To simplify, the discussion has centered on the choice between integrated and separate systems with the smart money tending to favor the first. By an integrated system is meant one in which all the information about the materials held by or ordered by the library is stored and manipulated by an integrated set of programs within a single hardware configuration. Further, in an integrated system all this information is presented to the user at one terminal. On the other hand, separate systems would be those in which each function is carried out independently of each other function. Some of these separate systems may even require separate central computers and separate and different terminals. This is an over-simplified picture because what has happened often in the real world has been that many libraries have created a hybrid of partially integrated and partially separate systems. In this latter case, for example, the functions of the catalog and the circulation system might be integrated and the acquisitions and serial control functions might each be carried out by separate systems.

Although the integrated system has been seen by most as the preferred alternative, the fact remains that few if any truly integrated systems have been achieved in medium-sized or large libraries. Even the partially integrated systems that have been achieved have been bedeviled by the complexity of the software which is required to deal with a number of interrelated subsystems. Fitting the different data required for different functions into the Procrustean bed of the integrated system format has proved to be even more difficult. The concept of separate systems for separate functions has not been favored because it makes more work for the library user and because it is really no more than the automated version of the pre-machine systems. On the other hand, there are distinct advantages for the programmer and system specifier when it comes to creating a tailor-made system to carry out a specific function. The choice, then, has always seemed to be between the complex architecture of the integrated system and the user hostility of the separate system approach. There is, however, another possibility which may resolve the seemingly inescapable dilemma. That third way is made possible by the use of the microcomputer.

There is another dimension to this matter. It concerns the need for information other than the traditional bibliographic information found

in catalogs, order files, and the like. That information consists of information about serial articles (from indexes, abstracts, etc.), data in electronic form, and (though it is little more than a gleam in Fred Kilgour's eye) the full text of publications in electronic form. It is hard even to imagine the integrated system which would bring all this and the traditional kinds of bibliographic information together and even harder to realize such a system. It is almost depressing to think of the separate system concept applied in this area. The thought of the library user being presented with twenty or more different terminals, each with its own commands and demands, is dismal indeed. Such an electronic Maginot Line would require staff resources which few libraries possess and would demand more application and effort from the user than any library has a right to expect. I wish I were as modern and progressive in these matters as Wilf Lancaster, but the fact remains that I still cling to the idea of the library more or less as we know it, to the notion that library service is intimately connected to the provision of information about printed materials (books, serials, etc.) as well as to the more whiz-bang materials, and to the belief that new methods of communication supplement rather than replace the older forms.

The germ of the Third Way—the alternative to both the integrated and separate system concepts—was born of the dilemma which we faced at the UIUC Library in combining a circulation system (LCS) and a MARC-based bibliographic system (WLN—Washington Library Network) to form our online catalog. For the moment all I need to mention is that we rejected both the idea of integrating the two systems (in any event a perilous and uncertain venture) and the idea of maintaining both as separate systems (if for no other reason than this approach would have been unfriendly, to say the least, to the library user). What we have done is to use microcomputers (IBM PCs) as public terminals, to implant interface programs in those microcomputers which translate the user's natural language queries into the arcane commands of the two systems, and to set up interactions between the microcomputers and the mainframe computer which economize on telecommunication costs (in that the majority of the processing—and all the unproductive processing—is done in the microcomputer). This is a small step for one library but one that is not without significance for library kind. The significance lies not in our local application but in the fact that two quite different systems are presented to the user as if they are one system. They have not been integrated but they do not stand alone. The circle has been squared. Neither integrated nor separate, the systems are nevertheless in harmony with the needs of the user. Remember also that these are completely different systems each with its own deep structure and each with its own economy and purpose.

I would suggest that this modest beginning opens up important possibilities for all online bibliographic systems and for the provision of

the kind of nonbibliographic information which I mentioned earlier. The essential point is that if, as we have demonstrated, one can design and write an interface program which links two completely different bibliographic systems then one could write such programs to link three, four, or five, or more such systems. In other words, the advantages of the separate system (that it is tailor-made for a particular function and performs its tasks with economy and efficiency) can be maintained in an environment which presents the user with the advantages of the integrated system (the bringing together and display of hitherto scattered and secret information).

Having thus resolved the dilemma of integrated *v.* separate bibliographic systems, let us turn our attention to the nonbibliographic dimension. This comprises three classes. The first is that of serial literature (what Dr. Ranganathan called "microthought"). We have traditionally given access to this kind of publication by means of printed indexing and abstracting services and latterly by online versions of such services. These services are inefficient, to say the least, because they are unorganized, random to a great degree, and because they are completely separate from the traditional bibliographic systems of the library. This is caused, in great part, by the fact that the indexing and abstracting services emanate from the for-profit sector. That sector is almost always philosophically and practically out of tune with the nonprofit sector which includes most libraries. The microcomputer, used intelligently, offers a way out of this problem too. If one can use a microcomputer to interact between two or more incompatible bibliographic systems, then there is no reason why its use could not be extended to the interaction between bibliographic and indexing/abstracting systems. Those services could be either online or held as a local database using videodisc technology.

Such an interaction of systems would go a long way, I believe, to refuting certain anomalous and erroneous findings of studies of early online catalogs. Those findings indicate that subject heading use increases dramatically when the move is made from pre-machine to online catalogs. It is my firm belief that this is a transitory phenomenon and that the increase in subject searches is partly due to the novelty of the online catalog and, in great part, to the fact that nothing better is available. I would predict confidently that, given easy and free subject access to current serial literature online (as part of the microcomputer-coordinated total library system), subject searches for monograph literature would subside to the previous low level. The key words in the preceding sentence are "easy and free subject access." The question of making the access easy for the user (to conform to Mooers Law of Least Effort) is technical and relatively easily solved. The question of free access is one which is financial, strategic, and political. It involves the reconciliation of the for-profit and nonprofit sectors and can thus be regarded as, at very least, thorny. On the other hand,

if we are serious about using technology to move into a new dimension of library service, then I can see no better struggle upon which to embark.

The second nonbibliographic class is that of data itself. There is, as has been pointed out often, an ever-growing mass of data available in machine-readable form. This data is not only available but is also, given the right programs, manipulable by the user. Again, there is no technical reason why such data and such programs could not be made available to the user, at the same terminal as the bibliographic and serial information, by the microcomputer controlled library system. This availability could be secured either to databases at remote locations or to locally held databases (again, perhaps using videodisc technology).

Lastly, there is the question of the electronic publication (monographic and serial in nature). Fred Kilgour (whose benign presence pervades this paper) is currently engaged upon a research project called EIDOS which seeks to make the content of monographs in machine-readable form available to the user. This access will be primarily by "unconventional" means (searches of contents pages, captions, full text, etc.). Such techniques could be applied, together with more conventional access points, to serial publications in machine-readable form. When EIDOS is operational and when the volume and importance of electronic journals merits it, the microcomputer-controlled library system will reach out to engage these sources of information and knowledge and to bring them to the user.

My message, then, is that the process of integrating and bringing to light the hitherto scattered information about library materials is most successfully achieved by microcomputer coordination of separate and differing systems rather than by attempts at completely integrated library systems. Beyond this, that the quantum leap in service which has been the result of the creation of "online catalogs" will be matched and exceeded by the next generation of library systems. Those systems will not only deal with bibliographic information but will also embrace the worlds of microthought, of data, and of publications in machine-readable form. All of this adds up neither to the demise of the library nor to the replacement of traditional means of communicating information and knowledge. On the contrary, it will lead to hitherto undreamed-of levels of enhancement of library service. Many years ago, Charles Ammi Cutter lamented the end of "the golden age of cataloguing." It is my firm belief that the library is on the threshold of a new Golden Age of bibliographic control and of provision of nonbibliographic information, and that a prime tool in this renaissance will be the humble microcomputer.

Post scriptum: Since this paper was delivered on a Sunday and since it opens with a quotation from a book of the Jerusalem Bible, it seems fitting to record a Biblical quotation (for which I am indebted to Lowell Oxtoby

of Western Illinois University Library) on the topic of the importance of redundancy in computer systems:

Two are better than one; because they have a good reward for their labour.

For if they fall, the one will lift up his fellow: but woe to him that is alone when he falleth; for he hath not another to help him up (Ecclesiastes, 4:9-10).

The autonomy and importance of the microcomputer in the systems which I envisage makes this exhortation of peculiar relevance.